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Linking errors in forecast weather to representation of the earth's surface

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Whilst the skill of some deterministic and ensemble forecasting systems in representing mid-tropospheric variables has reached a very high level, commuting that into a suitable representation of the all-important surface weather parameters, such as screen temperature and precipitation, and spread therein, can be a little more problematic. This is due, in part, to an imperfect knowledge of the state of the surface of the earth and imperfections in the representation of surface-based physics. Then, in turn, ensemble perturbations do not generally target uncertainties in these aspects.

This presentation will use recent European examples and some operational model reruns to illustrate and discuss, separately, some impacts of soil moisture, of sea surface temperature and of snow cover. Imperfections in the initialisation, physical representation and physical evolution of these aspects will be connected with surface weather forecast errors. Similarly, lack of spread in the surface state will be shown to explain bias and under-dispersion in ensemble forecasts of surface weather. Suggestions will be made, in each case, regarding possible ways forward. Impacts at extended range (weeks 2-4) will also be referenced.